



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/617,484      | 07/11/2003  | Thomas D. Marshall   | 5660-01102          | 2842             |

35690 7590 05/10/2006

MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C.  
700 LAVACA, SUITE 800  
AUSTIN, TX 78701

| EXAMINER |
|----------|
|----------|

STALLARD, JOSEPH A

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

3715

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                       |  |  |
|------------------------------|---------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/617,484  | <b>Applicant(s)</b><br>MARSHALL, THOMAS D. |  |
|                              | <b>Examiner</b><br>J. Andrew Stallard | <b>Art Unit</b><br>3715                    |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12/12/2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Preliminary Amendment***

In response to the preliminary amendment filed 12/12/2003, claims 37-67 are canceled and claims 1-36 are pending.

### ***Claim Objections***

1. **Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.** Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 states that the opening contains simulated decay material.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.** The claim(s) contains subject

matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant discloses, in the specification, that the simulated decay material should be able to be detected using caries detecting stains, but does not expressly disclose how to make simulated decay material with said feature. The stains to which applicant refers are intended to react with a specific type of organic material. It is unclear how such stains are used to cause similar reactions with the resins mentioned by applicant.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**3. Claims 1, 2, 5-7, 11, 12, 17, 21-23 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Vigg (US 2,750,670).**

**Claims 1 and 36:** Vigg discloses a model of dental caries, comprising: an artificial tooth (*Figs. 3 and 4*), wherein the artificial tooth comprises a cavity (57), and wherein the cavity comprises: an opening that extends from an exterior surface of the artificial tooth to at least a simulated dentinoenamel junction of the

artificial tooth; and wherein the opening extends along at least a portion of the simulated dentinoenamel junction (*Figs. 3 and 4; A cavity can extend from the exterior of the tooth through the enamel to the dentin, as shown.*); and simulated decay material in the cavity (*col. 5, 37-48; A cavity can be filled with simulated decay material.*).

**Claims 2:** Vigg discloses that the opening contains simulated decay material (*col. 5, 37-48*).

**Claim 5:** Vigg discloses that the artificial tooth comprises resin (*col. 5, 7-10; Dentin can comprise resin.*).

**Claim 6:** Vigg discloses that the artificial tooth comprises melamine resin (*col. 5, 10-11*).

**Claim 7:** Vigg discloses that a surface defined by the cavity is configured to bond to the simulated decay material (*col. 5, 47-52; Decay material can be removed by drilling. Decay material must be able to bond to the cavity in order to realistically be removed by drilling.*).

**Claim 11:** Vigg discloses that the simulated decay material comprises a resin material (*col. 5, 44-48; Decay material can comprise the same material used for a pulp member, which can be thermosetting plastic (col. 4, 47-55).*).

**Claim 12:** Vigg discloses that the simulated decay material comprises a porous substance (*col. 4, 47-55; Decay material (similar to pulp material - col. 5, 44-48) can be thermoplastic.*).

**Claim 16:** Vigg discloses that the simulated decay material is homogeneous (*col. 4, 47-55; Decay material can be thermoplastic, as described above.*).

**Claim 17:** Vigg discloses that the simulated decay material is curable (col. 4, 47-55; *Decay material can be rubber or thermosetting plastic, as described above.*).

**Claims 21:** Vigg discloses that the simulated decay material is radiolucent (col. 5, 64-68; *Decay material can be substantially free of radio-opaque material.*).

**Claims 22:** Vigg discloses that the simulated decay material is radio-opaque (col. 5, 53-57; *Decay material can be radio-opaque.*).

**Claims 23:** Vigg discloses that the simulated decay material is of uniform hardness (col. 4, 47-55; *Decay material can be thermoplastic or rubber (as described above), which both have uniform hardness.*).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**4. Claims 3, 4 and 26-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Hayka et al. (US 5,688,118).**

**Claims 3 and 28:** Vigg discloses applicant's basic inventive concept of a model of dental caries, substantially as claimed, but does not expressly disclose the opening comprises one or more grooves along the simulated dentinoenamel

junction. Hayka discloses the progression of caries through a tooth comprises one or more grooves along the dentinoenamel junction (*col. 1, 47-50; Figs 2a-2c show the progression of decay material including grooves along the junction between the dentin and enamel.*). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Hayka to modify the model of Vigg by simulating the progression of caries of Hayka to provide a realistic simulation.

**Claim 4:** Vigg/Hayka teaches the opening comprises one or more grooves, as described above, and Vigg discloses that at least one of the grooves contains simulated decay material (*col. 5, 37-48*).

**Claim 26:** Vigg discloses a model of dental caries, comprising: an artificial tooth (*Figs. 3 and 4*), wherein the artificial tooth comprises a cavity (57), and wherein the cavity comprises: an opening that extends from an exterior surface of the artificial tooth to at least a simulated dentinoenamel junction of the artificial tooth (*Figs. 3 and 4*); and simulated decay material in the cavity (*col. 5, 37-48*). Vigg/Hayka teaches one or more grooves extending from the opening, as described above.

**Claim 27:** Vigg discloses that the opening contains simulated decay material (*col. 5, 37-48*).

**Claim 29:** Vigg/Hayka teaches that at least one of the grooves extends along at least a portion of the simulated dentinoenamel junction, as described above, and Vigg discloses at least one of the grooves contains simulated decay material (*col. 5, 37-48*).

**Claim 30:** Vigg discloses that the artificial tooth comprises resin (*col. 5, 7-10; Dentin can comprise resin.*).

**Claims 31:** Vigg discloses that the simulated decay material is radiolucent (*col. 4, 56-58; Decay material can be free of radio-opaque material, as described above.*).

**Claims 32:** Vigg discloses that the simulated decay material is radio-opaque (*col. 5, 53-57; Decay material can be radio-opaque.*).

**Claims 33:** Vigg discloses that the simulated decay material is of uniform hardness (*col. 4, 47-55; Decay material can be thermoplastic or rubber (as described above), which both have uniform hardness.*).

**5. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Stein (US 3,846,011).**

**Claim 8:** Vigg discloses a model of dental caries. Vigg does not disclose expressly that a surface defined by the cavity is textured. Vigg teaches that it is the object of the model to accurately simulate the texture of the elements of the tooth (*col. 1, 42-45*). Examiner takes OFFICIAL NOTICE that it is well known in the art of dentistry that the insides of cavities include texturing. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention for a surface defined by the cavity, in the model of Vigg, to be textured because this and other prior art models are intended to simulate such, and this feature would make the model more realistic.

**Claims 9-10:** Vigg discloses a model of dental caries. Vigg does not disclose expressly that a surface defined by the cavity is textured with an etching solution, and wherein the etching solution comprises an acid. Stein teaches texturing the surface of plastic using acid etching (*col. 1, 21-24*). As described above, it is obvious to texture a surface defined by the cavity. Stein teaches a method for doing so. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Stein to modify the model of Vigg by texturing the surface defined by the cavity with an acid etching solution as taught by Stein to provide a more realistic model.

**6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Sugiura et al. (US 5,674,930).**

Vigg discloses the simulated decay material comprises a porous substance (*col. 4, 47-55*). Vigg does not disclose expressly the porous substance comprises pumice. Sugiura discloses a thermoplastic resin (*col. 3, 3-7*) using inorganic fillers (*col. 12, 59*) like pumice (*col. 13, 2*). It would benefit the porous substance (such as thermoplastic) of Vigg to include inorganic filler to reduce the cost of the simulated decay material. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Sugiura to modify the simulated decay material of Vigg by adding the pumice of Sugiura to reduce the cost.

**7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Doret (US 2,256,667).**

**Claim 14:** Vigg discloses a model of dental caries. Vigg does not expressly disclose that the simulated decay material comprises coloring. Doret discloses that the simulated decay material comprises coloring (*col. 3, 14-20; Parts of the artificial tooth including the various ailments (like tooth decay (34)) can be colored.*). Doret teaches that the coloring of the parts in their natural tints is very desirable in order to thoroughly impress the patients and students and obtain their full attention (*col. 3, 14-20*). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Doret to modify the model of Vigg by including the coloring of Doret to thoroughly impress the patients and students and obtain their full attention.

**8. Claims 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Fukunishi et al. (US 6,084,005).**

**Claim 15:** Vigg discloses a model of dental caries. Vigg does not disclose expressly that the simulated decay material comprises food coloring. However, Vigg indicates simulating color (*col. 1, 42-45*). Applicant has not disclosed that food coloring solves any stated problem or is for any particular purpose. Moreover, it appears that the model of Vigg, or applicant's invention, would perform equally well with the coloring taught by Vigg. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the

invention was made to have modified Vigg to use food coloring because such a modification would have been considered a mere design consideration which fails to patentably distinguish over Vigg.

**Claim 20:** Vigg discloses applicant's basic inventive concept of a model of dental caries, substantially as claimed, but does not expressly disclose that the simulated decay material is detectable by caries detecting stain. Fukunishi shows this feature to be old in the dental art. Fukunishi teaches that a caries detecting stain is conventional in the treatment of tooth caries (*col. 1, 16-21*). Vigg discloses that it is desirable to provide the experience of operating on an actual tooth (*col. 5, 48-52*). Since it is conventional to use a caries detecting stain when operating on teeth with caries, it would benefit the model of Vigg to have decay material that is detectable by caries detecting stain to provide a more realistic simulation. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Fukunishi to modify the model of Vigg by allowing for the use of caries detecting stain taught by Fukunishi to provide a more realistic simulation.

**9. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Muller et al. (US 5,070,165).**

Vigg discloses a model of dental caries. Vigg does not disclose expressly that the simulated decay material is curable with visible light. Muller discloses a plastic curable by visible light (*col. 17, 25-28*). It would have been obvious to one

of ordinary skill in the art at the time of the applicant's invention from the teaching of Muller to modify the model of Vigg by using the plastic curable by visible light taught by Muller to provide a plastic that is easy to cure.

**10. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) in view of Turdiu et al. (US 6,164,966).**

Vigg discloses a model of dental caries. Vigg does not disclose expressly that an outer layer of simulated decay material is softer than an inner layer of simulated decay material (and thus the inner layer has a greater hardness than the outer layer, as in claim 25). Turdiu discloses that in an actual caries-infected tooth an outer layer of decay material (*demineralization zone 33 (col. 4, 55-56)*) can be softer than an inner layer of decay material (*transparent dentin 35 (col. 4, 56), also known as sclerotic dentin*). It would benefit the model of Vigg to use the teachings of Turdiu as a basis for simulating decay material because Turdiu teaches how decay material is in a real tooth. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Turdiu to modify the model of Vigg by using the decay material layers taught by Turdiu to more accurately simulate real decay material.

**11. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vigg (US 2,750,670) over Hayka et al. (US 5,688,118) as**

**applied to claim 26 above, and further in view of Turdiu et al. (US 6,164,966).**

Vigg/Hayka discloses a model of dental caries. Vigg/Hayka does not disclose expressly that an outer layer of simulated decay material is softer than an inner layer of simulated decay material (and thus the inner layer has a greater hardness than the outer layer, as in claim 35). Turdiu discloses that in an actual caries-infected tooth an outer layer of decay material (*demineralization zone 33 (col. 4, 55-56)*) can be softer than an inner layer of decay material (*transparent dentin 35 (col. 4, 56), also known as sclerotic dentin*). It would benefit the model of Vigg/Hayka to use the teachings of Turdiu as a basis for simulating decay material because Turdiu teaches how decay material is in a real tooth. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention from the teaching of Turdiu to modify the model of Vigg/Hayka by using the decay material layers taught by Turdiu to more accurately simulate real decay material.

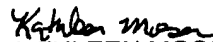
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Andrew Stallard whose telephone number is (571) 272-2685. The examiner can normally be reached on 9:15 am to 6:45 pm - Mon - Fri (1st Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Olszewski can be reached on (571) 272-6678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

J. Andrew Stallard  
Examiner  
Art Unit 3715

  
KATHLEEN MOSSER  
PRIMARY EXAMINER